

24169
S/039/61/054/001/002/003
C111/C222

X

On a system of linear ...

α and β are complex numbers $\text{Im } \frac{\alpha}{\beta} \neq 0$; the $f_k(z)$ are the sought functions. The author investigates the compatibility of the system and the meromorphic solutions for the case that $a_{kl}(z) = a_{kl}$, $b_{kl}(z) = b_{kl}$.

Chapter I. Existence of solutions. § 1. Conditions of compatibility. Theorem 1: It is necessary and sufficient for the compatibility of the system (A) that there exist the identities:

$$\left. \begin{aligned} H(z + \beta) H(z) &= H(z + \alpha) H(z), \\ G(z + \beta) - H(z + \alpha) G(z) &= H(z + \alpha) - H(z + \beta) H(z). \end{aligned} \right\} \quad (1.1)$$

§ 2. Functions of elliptic form. Let $E_{\lambda\mu}(z)$, $\lambda \neq 0$, $\mu \neq 0$ be an elliptic function of second kind: $E_{\lambda\mu}(z) \neq 0$ meromorphic, $E_{\lambda\mu}(z + \alpha) = \lambda E_{\lambda\mu}(z)$, $E_{\lambda\mu}(z + \beta) = \mu E_{\lambda\mu}(z)$. Let $\zeta = \zeta(z)$ be the Weierstrass Zeta function, $p_{st}(z)$ - elliptic function and

$$p_k(z, \zeta) = \sum_{0 \leq s+t \leq k} p_{st}(z) z^s \zeta^t(z)$$

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The function $e(z, \lambda, \mu, k) = E_{\lambda\mu}(z)p_k(z, \zeta)$ is called a function of elliptic form of the degree k . Some properties of such functions are formulated and partially proved. § 3. General solution of the system with constant coefficients. At first the author investigates the homogeneous system

$$F(z + \alpha) = \mathcal{M}F(z), F(z + \beta) = \mathcal{N}F(z), \quad \gamma \frac{\alpha}{\beta} \neq 0 \quad (3.1)$$

where $\mathcal{M} = \|a_{kl}\|$, $\mathcal{N} = \|b_{kl}\|$ ($k, l = 1, 2, \dots, n$), $|\mathcal{M}| \neq 0$, $|\mathcal{N}| \neq 0$. The condition of compatibility reads $\mathcal{M}\mathcal{N} = \mathcal{N}\mathcal{M}$. Theorem 2: If $\mathcal{M}\mathcal{N} = \mathcal{N}\mathcal{M}$ then the general solution of (3.1) in the class of meromorphic functions is given by

$$f_1(z) = \sum_{j=1}^s e_1(z, \lambda_j, \mu_j, k_j), \quad s + k_1 + k_2 + \dots + k_s = n \quad (3.2)$$

($l = 1, 2, \dots, n$)

where $e_1(z, \lambda_j, \mu_j, k_j)$ are functions of elliptic form of the degree k_j ;

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λ_j and μ_j are eigenvalues of M and N ; k_j is integral and smaller than the multiplicities of λ_j and μ_j .

The author considers the system

$$\left. \begin{aligned} F(z + \alpha) &= M F(z) + G(z), & |M| \neq 0, & \gamma \frac{\alpha}{B} \neq 0, \\ F(z + B) &= N F(z) + H(z), & |N| \neq 0, \end{aligned} \right\} \quad (3.3)$$

where $g_\alpha(z)$, $h_B(z)$ are meromorphic functions.

Theorem 3: If the conditions of compatibility

$$MN = NM, \quad H(z + \alpha) - MH(z) \equiv G(z + B) - NG(z) \quad (3.4)$$

are satisfied then (3.3) has meromorphic solutions.

§ 4. Poles and principal parts. Let $\alpha_1, \alpha_2, \dots, \alpha_k$ be arbitrary points of the semi-closed parallelogram $\square(z_0)$ with the corners z_0 , $z_0 + \alpha$, $z_0 + \alpha + B$, $z_0 + B$ and let

$$R(z, \alpha_j) = \sum_{k=1}^{s_j} \frac{a_{jk}}{(z - \alpha_j)^k}$$

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be arbitrary rational functions.

Theorem 4 : Let every pair (λ_j, μ_j) in (3.2) satisfy the condition

$$\alpha \ln \mu - \beta \ln \lambda \neq 0 \quad (4.1)$$

Let α_{ij} ($1 \leq i \leq n$, $1 \leq j \leq k_i$) be points of the $\Gamma(z_0)$, and

$$R(z, a_{ij}) = \sum_{k=1}^{s_{ij}} \frac{a_{ij}^k}{(z-a_{ij})^k} \text{ be arbitrarily given rational functions.}$$

There exists a unique meromorphic solution $f_1(z), f_2(z), \dots, f_n(z)$ of (3.3) (and of (3.1)) so that the $f_i(z)$ ($i = 1, 2, \dots, n$) in the points α_{ij} ($1 \leq j \leq k_i$) and only in them have poles with the principal parts $R(z, a_{ij})$.

Chapter II. The increase of the integral and the meromorphic solutions.
§ 5. The increase of the solutions of the homogeneous system. The order of a meromorphic function is defined by $P\{f(z)\} = P\{T(r, f)\}$.

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Let the order of the matrix $F(z)$ be defined by $P\{F(z)\} = \max_i [T(r, f_i)]$

Theorem 5 : The order of an arbitrary meromorphic (but not integral!) solution of the homogeneous system (3.1) is 2 . The order of an arbitrary integral transcendent solution of (3.1) is 1 . If the integral or meromorphic solution $F(z)$ of (3.1) is represented by (3.2), and if all pairs (λ_j, μ_j) for which $e(z, \lambda_j, \mu_j, k_j) \neq 0$, satisfy the condition

$$|\lambda_j| = |\mu_j| = 1, \quad (5.1)$$

then $P\{m(r, F)\} = 0$; if (5.1) is not satisfied for at least one j then $P\{m(r, F)\} = 1$.
($m(r, F)$ is defined by $m(r, F) = \max_i [m(r, f_i)]$).

§ 6. Increase of the integral solutions of the inhomogeneous system
Let all elements of $G(z)$ and $H(z)$ be entire functions.

Let $\lim_{r \rightarrow \infty} \frac{m(r, g)}{r} = A$. Let the entire matrix (or function) belong to the first or second or third class in dependence of the fact whether

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$\lambda = 0$, $0 < A < \infty$ or $A = \infty$.

Theorem 6 : If $G(z)$ and $H(z)$ belong to the first class then the compatible system (3.3) (having integral solutions) has an integral solution $F(z)$ which belongs to the first class, and it holds $P \{ F(z) \} = P \{ G(z) \} = P \{ H(z) \}$.

Theorem 7 : If the entire matrices $G(z)$ and $H(z)$ belong to the second class and if at least one of them is of the second class then all integral solutions of (3.3) (if existing) belong to the second class too.

Theorem 8 : If $G(z)$ and $H(z)$ are entire matrices, and if at least one of them belongs to the third class then every integral solution $F(z)$ of (3.3) satisfies the condition: $P \{ F(z) \} = \max [P \{ G(z) \}, P \{ H(z) \}]$.

7. Lemma on the growth of meromorphic functions.

8. The growth of meromorphic solutions of the inhomogeneous system. Let $G(z)$, $H(z)$ be meromorphic matrices.

Theorem 9 : If $F(z)$ is an arbitrary meromorphic solution of a compatible system (3.3), and if

$$\max [P \{ G(z) \}, P \{ H(z) \}] = \rho \quad (8.1)$$

then

Proof 7, 8

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on a system of linear

$$P_{\alpha} \{ \Sigma(r, F) \} = 2 + \beta \quad (9.2)$$

and

$$P_{\alpha} \{ \Sigma(r, F) \} = \max \{ 1, \beta \} \quad (9.3)$$

$$\Sigma(r, F) = \max_{1 \leq i \leq n} \{ \Sigma(r, f_i) \}.$$

9. System of two difference equations. The results obtained for the system (3.3) are partially transferred to the system

$$f(z+n) = \sum_{k=0}^{n-1} p_k(z) f(z+k) + a(z), \quad p_0(z) \neq 0, \quad (1.2)$$

$$g(z+n) = \sum_{k=0}^{n-1} q_k(z) g(z+k) + b(z), \quad q_0(z) \neq 0$$

author, V. I. Vinich. He thanks A. I. Markushevich for the

There are 6 Soviet- and 5 non-Soviet- language references. The reference

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to the English language publication reads as follows : J.M. Whittaker,
A theorem on meromorphic functions, Proc. London Math. Soc., 40 (1935),
255 - 272.

SUBMITTED: June 12, 1959

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Card 9/9

NAFTALEVICH, A.G. (Vil'nyus)

Structure of the set of generalized periods of the meromorphic
function matrix. *Matsbor.* 56 no.3:309-324, 1962. (MIRA 15:4)

(Functions, Meromorphic) (Matrices)

S/039/62/057/002/001/003
B172/B112

AUTHOR: Naftalevich, A. G. (Vil'nyus)

TITLE: Use of an iteration method for solving a difference equation

PERIODICAL: Matematicheskiy sbornik, v. 57 (99), no. 2, 1962, 151-178

TEXT: The equations considered have the form

$$M[f(z)] = \sum_{k=1}^n a_k(z)f(z + \alpha_k) = g(z)$$

(α_k = complex numbers, $a_k(z)$ and $g(z)$ = given functions, $z = x + iy$, $f(z)$ is sought). Formal solutions are constructed in the following way: the operators A and B are defined by

$$A[f(z)] = - \sum_{k=2}^n a_k(z - \alpha_1)f(z + \alpha_k - \alpha_1)/a_1(z - \alpha_1),$$

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Use of an iteration method ...

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$$B[f(z)] = - \sum_{k=1}^{n-1} a_k(z - \alpha_n) f(z + \alpha_k - \alpha_n) / a_n(z - \alpha_n)$$

The sum $G + H$ of the series

$$G[s(z)] = s(z) + A[s(z)] + A^2[s(z)] + \dots,$$

$$H[t(z)] = t(z) + B[t(z)] + B^2[t(z)] + \dots$$

is a formal solution when $s(z)$ and $t(z)$ are chosen such that $a_1 s(z + \alpha_1) + a_n(z) t(z + \alpha_n) = g(z)$. Several theorems on the

properties of these formal solutions are proved, e.g., the theorem that a solution of the above equation can be constructed if the poles and main components are given. The more general problem of constructing meromorphic (integral) solutions of which the Laurent-(Taylor) expansions begin at given points with given groups of terms is also discussed.

SUBMITTED: November 14, 1960

Card 2/2

NAFTALI, S., ing.

Achievements and prospects of designing in the wood industry. and
lemnului 15 no.2:41-45 R'64.

KOVACS, L., dr.; NAFTALI, Z., dr.

A radiological syndrome in splenomegaly. Med. inter., Bucur 13
no.5:793-800 My '61.

1. Lucrare efectuata in Clinica medicala I si Clinica chirurgicala
din Tirgu Mures.
(SPLENOMEGALY radiography)

NAFTALIYEV, N.Ya.; FITOVA, L., red.

[Growing vegetables on irrigated land is profitable to the collective farm] Vyrashchivanie ovoshchei na polivnykh zemliakh vygodno kolkhozu. Kishinev, Kartia moldoveniaske, 1965. 41 p. (MIRA 18:4)

1. Rukovoditel' peredovoy ovoshchevodcheskoy brigady No.9 kolkhoza im. Michurina Tiraspol'skogo rayona (for Neftaliyev).

VOROB'YEV, S.A., prof.; KRUPENINA, A.P., kand. sel'skokhoz. nauk;
LOSHAKOV, V.G., kand. sel'skokhoz. nauk; VOZNESENSKIY, K.N.;
KUDIN, V.I.; KOBLEV, Yu.M.; YEFIMOV, I.T., kand. sel'skokhoz.
nauk; MASANDILOV, E.S., kand. sel'skokhoz. nauk; NAFTALIYEV,
Sh.P., aspirant; PANASYUK, B.A., aspirant

Concentration of crop rotations. Zemledelie 27 no.7:55-70
Jl '65. (MIRA 18:7)

1. Moskovskaya sel'skokhozyaystvennaya akademiya imeni K.A. Timiryazeva (for Vorob'yev, Krupenina, Loshakov).
2. Glavnyy agronom po kormam Ministerstva sel'skogo khozyaystva Tadzhikskoy SSR (for Voznesenskiy).
3. Brestskaya oblastnaya sel'skokhozyaystvennaya opytnaya stantsiya (for Kudin).
4. Adygeyskaya oblastnaya sel'skokhozyaystvennaya opytnaya stantsiya (for Koblev).
5. Krasnodarskiy nauchno-issledovatel'skiy institut sel'skogo khozyaystva (for Yefimov).
6. Dagestanskiy nauchno-issledovatel'skiy institut sel'skogo khozyaystva (for Naftaliyev).
7. Ukrainskaya sel'skokhozyaystvennaya akademiya (for Panasyuk).

LEYKIN, I.M.; LEBEDEV, Yu.I.; ANDREYEV, I.I.; BEDA, N.N.; Prinimali uchastnye: LIVSHITS, G.L.; TEREENT'YEVA, Ya.K.; FILONOV, V.G.; GONCHAROV, I.A.; NAFTALOVICH, S.M.; KUPRIKOV, P.Z.; ABKINA, R.I.; ROSHCHINA, A.A.; LUPYAKOV, A.G.

Steel of the 18G2-grade. Sbor. trud TSNIICHM no.35:92-101 '63.
(MIRA 17:2)

NAFTOL'YEV, Ya.A... podpolkovnik meditsinskoy sluzhby

Case of cancer of the appendix vermiformis. Voen.-med.zhur. no.6:
80-81 Je '51. (MLRA 9:9)

(APPENDIX (ANATOMY)--CANCER))

NAFTULIN, M.E.; SHVETS, Yu.A.; UDOVENKO, K.A.; DZHANUTSTSO, K.A.;
IVASHCHENKO, P.M.; BELEN'KIY, V.I.; BYCHENKO, N.A.

Coloring filmlike layers of asbestos-cement sheet products. Stroi.
mat. 6 no. 5:24-25 My '60. (MIRA 13:7)
(Asbestos cement)
(Coloring matter)

NAFTULIN, M.E.

Frameless asbestos-cement wall panels. Stroil. mat. 6 no.10:6-7
0 '60. (MIRA 13:10)

1. Direktor Khar'kovskogo zavoda izolyatsionnykh i asbestotse-
mentnykh materialov.
(Walls) (Asbestos cement)

NAFTULIN, M.E.; UDOVENKO, K.A.

Asbestos-cement boxlike wall panels. Suggested by M.E. Naftulin,
K.A. Udovenko. Rats. i izobr. predl. v stroi. no. 16:35-37 '60.
(MIRA 13:9)

1. Po materialam zavoda izolyatsionnykh i asbestotsementnykh
materialov Khar'kovskogo sovnarkhoza.
(Windows) (Building blocks)

NAFTULIN, N.M.

Organization of neurosurgical care in the Orlov Province Hospital.
Zdrav. Ros. Feder. 4 no.8:13-15 Ag '60. (MIRA 13:9)

1. Iz neyrokhirurgicheskogo otdeleniya (zav. N.I.Arzhanov) Orlovskoy
oblastnoy bol'nitsy (glavnyy vrach M.P. Khrisanopulo).
(ORLOV PROVINCE—NERVOUS SYSTEM—SURGERY)

SHIPEROVA, R.Ya., kand.med.nauk; NAFTULIN, N.M.

Centennial of the Orel Medical Society. Zdrav. Ros. Feder. 6 no.3:
32-36 Mr '62. (MIRA 15:4)

1. Iz Orlovskogo oblastnogo otdela zdavookhraneniya (zav. K.A.Trofimov).
(OREL—MEDICAL SOCIETIES)

L 20388-66 EWT(1)/EWT(a)/ETC(f)/EPF(n)-2/EWG(m)/EWA(h)
 ACC NR: AT6001562 SOURCE CODE: UR/3136/65/000/926/0001/0012

AUTHOR: Naftulin, S. M.

ORG: Institute of Atomic energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: Static characteristics of a voltage stabilizer for an electromagnetic isotope separator

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-926, 1965. Staticheskiye kharakteristiki stabilizatora napryazheniya elektromagnitnogo separatora izotopov, 1-12

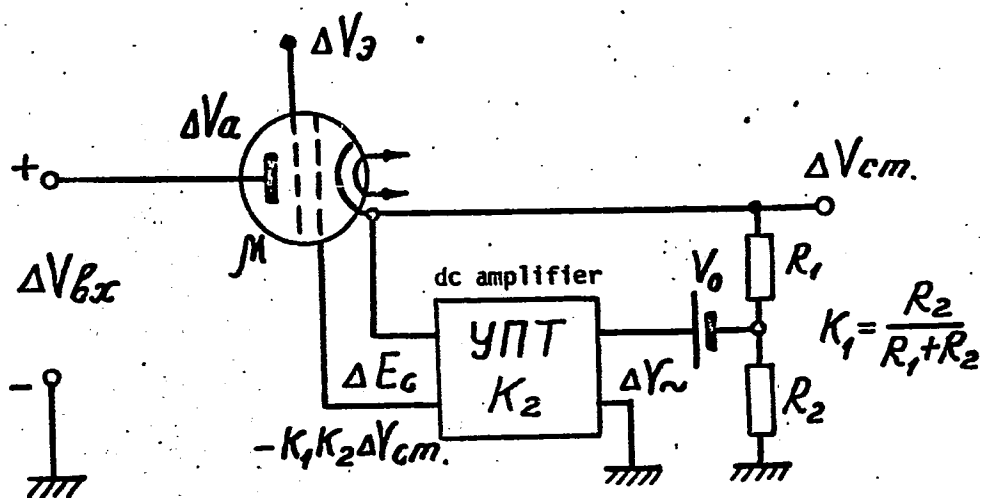
TOPIC TAGS: voltage stabilizer, isotope separation equipment, circuit design

ABSTRACT: The author describes a high-voltage stabilizer for a magnetic separator, with 40 kv voltage and load current of approximately 1 a. The stabilizer is of the compensation type based on the use of a balance circuit, uses vacuum tubes, and provides a stabilization accuracy on the order of 2×10^{-4} . The circuit is described in detail (Fig. 1) and its static characteristics are analyzed in order to determine the influence of the different disturbances on the stabilized voltage and to determine the parameters of the circuit elements. The overall stabilization coefficient obtained is 3700. The change in the time of the stabilizer in

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Fig. 1. Equivalent circuit of the stabilizer

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the case of a spark breakdown in an ion source amounts to 6×10^{-4} sec. A variable resistance is provided to adjust the transient characteristic and makes it possible to obtain an aperiodic transient with a single overshoot. The author thanks I. M. Averin for help with the work. Orig. art. has: 4 figures and 4 formulas.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 002

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S/130/61/000/008/004/005

A006/A101

AUTHORS: Naftulovich, S. M.; Danchenko, N. F.

TITLE: Cast-iron rolls replace steel rolls

PERIODICAL: Metallurg, no. 8, 1961, 26

TEXT: The bottom and middle steel rolls in the three-high plate mill (Lauth type) at the Metallurgical Plant imeni Petrovskiy have been replaced by chilled cast-iron rolls of 893 mm in diameter. The rolls have chilled layers 15 - 20 mm and 20 - 22 mm thick, respectively with a Shore hardness of 60. The composition of the middle roll is 3.06% C, 0.32% Mn, 0.42% Si, 0.08% S, 0.54% P, 0.07% Cr and 0.30% Ni. Corresponding percentages for the bottom roll are: 3.07, 0.35, 0.46, 0.08, 0.55, 0.06, 0.34. The advantages of the rolls are: the amount of rolled plates until normal wear of the rolls is raised by a factor of 2.5; the use of the rolls until regrinding is raised by a factor of 1.5; the wear of the middle and bottom roll is approximately equal, so that the rolling process is more stable. The rolls worked for 17 shifts without being changed and rolled 6,493 tons (middle roll) and 5,900 tons (bottom roll) for one mm of wear. Roll

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Cast-iron rolls replace steel rolls

consumption was reduced by a factor of 2.1 and mill productivity increased by 3%.
There is 1 table.

ASSOCIATION: TsZL zavoda imeni Petrovskogo (Central Laboratory of the Plant
imeni Petrovskiy)

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A006/A101

AUTHOR: Naftulovich, S. M.

TITLE: Experimental rolling of converter metal plates

PERIODICAL: Metallurg, no. 9, 1961, 24-25

TEXT: Experimental rolling of 4 heats of killed and rimming KCT.3 (KSt.3) steel to 12, 20 and 30 mm thick sheets was performed on a plate mill. Simultaneously 2 heats of killed and rimming MCT.3 (MSt.3) open hearth steel were rolled in order to compare their mechanical properties. The rimming converter and open hearth steels were cast into 3 ton ingots, the killed steels into 3.17 ton ingots. Each experimental heat included 4 ingots which were rolled to sheets of the following dimensions: 12 x 2,300 x 7,200 - 9,000 mm; 20 x 1,500 - 1,800 x 6,400 - 7,500 - 8,000 and 30 x 1,500 - 1,800 x 4,200 - 5,400 mm. The experimental metals were heated under similar conditions. The temperatures of the beginning and end of rolling were fixed, and the number of passes, gas and air consumption for each heating furnace were established. Maximum reduction was employed in the initial passes which decreased at the end of rolling. After rolling and dressing the sheets were cooled in piles and after cooling down to

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Experimental rolling of converter metal plates

about 100°C they were cut to gauged length. Specimens cut out of the sheets were subjected to tensile and impact tests. The tests showed that the mechanical properties of both killed and rimming converter metal were not below those of open-hearth sheet metal. External or internal defects were not discovered. The behaviour of the converter metal during rolling was quite satisfactory, the ingot was easily deformed at the same degree of reduction employed for open hearth steel sheets. The chemical composition plays an important part in obtaining high mechanical properties for both converter and open hearth metal. Optimum carbon, manganese and phosphorus content raises the strength characteristics of the metal and reduces relative elongation.

ASSOCIATION: TsZL zavoda im. Petrovskogo (TsZL of the Plant imeni Petrovskiy)

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GORODETSKIY, L.N.; CHIGIRINSKIY, V.M.; NAFTULOVICH, S.M.; DANCHENKO, N.F.; YEMEL'YANOV, V.P.; BARBASHIN, B.M.

In rolling mills all over the country. Metallurg 6 no.8:25-28
Ag '61. (MIRA 14:8)

1. Rel'sobalochnyy tsekh zavoda im. Petrovskogo (for Gorodetskiy, Chigirinskiy). 2. Tsentral'naya zavodskaya laboratoriya zavoda im. Petrovskogo (for Naftulovich, Danchenko). 3. Magnitogorskiy metallurgicheskiy kombinat (for Yemel'yanov). 4. Starshiy master blyuminga zavoda im. Voroshilova (for Barbashin).
(Rolling mills)

NAFTUL'YEV, N.Z., podpolkovnik meditsinskoy sluzhby

Preflight relaxation and medical room. Vest. protivorozd. chor.
(MIRA 14:7)

no.5:52 My '61.

(Flight crews) (Air, Ionized--Therapeutic use)

POLAND

NAGAJ, Helena, Wojewodztwo Sanitary and Epidemiological
Station (Wojewodzka Stacja Sanitarne-Epidemiologiczna) in
Krakow (Director: Docent, Dr. M. BILEK)

"Action of DDT-Soap on Pediculus Humanus Vestimenti L. Lice."
Warsaw, Przegląd Epidemiologiczny, Vol 16, No 3, 62, pp 333-
340.

Abstract: [Author's English summary] The action of various
solutions of DDT-soap (5 percent DDT) on lice Pediculus
humanus vestiment L has been tested. A 0.5--1.0 percent so-
lution of DDT-soap killed the lice completely. Lower con-
centration of DDT in fabrics (impregnated and often washed
or stored for a long time) kept some lice alive. DDT re-
sistant lice population can thus be produced. Of the 10
references, five are Western, and the rest Polish.

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POLAND

MARAJ, Helena; Wojewodztwo Health and Epidemiology Station
(Wojewodzka Stacja Sanitarno-Epidemiologiczna), Kralow,
Director: Docent Dr. H. MARAJ.

"An Effort to Produce Lice Resistant to DDT Soap"

Warsaw, Przegląd Epidemiologiczny, Vol. XVI, No. 4, 1962,
pp 467-471

Abstract: [Author's English summary modified] Lice (*Pediculus humanus vestimentis* L.) were exposed to various solutions of 5 percent DDT soap, which resulted in the production of lice resistant to given solutions of DDT soap to which they had been previously exposed. The resistance lasted as long as the insecticide acted. It disappeared in the 9th generation (on the average) after the action of the insecticide stopped. The higher the concentration of DDT soap used, the more generations of lice remained resistant to the insecticide. 1 table; 4 diagrams; 12 references, predominantly Western.

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ROMANKOVA, A.G.; ~~NAGALYUK, Ye.A.~~

Favorable conditions for the formation of humus-type compounds
by mold fungi. Pochvovedenie no.8:8-14 '59. (MIRA 12:11)

1. Leningradskiy ordena Lenina gosuniversitet im. A.A. Zhdanova.
(Humic acid) (Molds(Botany))

S/0124/64/000/006/B052/B053

ACCESSION NR: AR4042227

SOURCE: Ref. zh. Mehkanika, Abs. 68319

AUTHOR: Nagamatsu, Kh. T.

TITLE: Constructing and designing shock tubes

CITED SOURCE: Sb. Osnovn. rezul'taty* eksperimentov na udarn. trubakh. M., Gosatomizdat, 1963, 100-153

TOPIC TAGS: shock tube, hypersonic flow

TRANSLATION: A survey of a group of questions connected with obtaining high temperatures and hypersonic flows in shock tubes. Gives fundamental equations describing flow in different parts of shock tubes and assumptions utilized in their derivation. A description of construction and work of basic elements of a hypersonic shock tube: the high-pressure chamber, the diaphragm, the nozzle, the damper tank and measuring section. Considers different methods of obtaining strong shock waves and methods of heating the propelling gas: combustion of mixture of hydrogen and oxygen, electric discharge with accelerating magnetic field, double chamber and

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ACCESSION NR: AR4042227

others. A description of different measuring instruments (optical, thermal, ionization pickups and pressure pickups). Experimental data on measurement of pressure after a shock wave, shadow photographs of flow around a wedge, cone, sphere, and flat plate at $M = 10$ at different stagnation temperatures $T_{0\pi} = 1050-5800^\circ K$. Considers influence of stagnation temperature on distance of departure of shock wave from sphere at $M = 10$. Bibliography: 67 references.

SUB CODE: ME

ENCL: 00

Card 1 2/2

KEROWAN, F.A., starshiy nauchnyy sotrudnik; NAGAPETYAN, L.S.,
mladshiy nauchnyy sotrudnik

Roentgenography of the thyroid gland. Vop.rent.i onk. 6:95-102
'61. (MIRA 16:2)

(THYROID GLAND—RADIOGRAPHY)

NAGAPETYAN, L.S., mladshiy nauchnyy sotrudnik

Two cases of osteopoikilosis. Vop.rent.i onk. 6:171-173 '61.
(MIRA 16:2)

(OSTEOSCLEROSIS)

KHEROBYAN, F.A., starshiy nauchnyy sotrudnik; NAGAL'TYAN, I.I., staryiy
nauchnyy sotrudnik

Diagnosis of giant-cell tumors (osteoblastoblastomas) of the
jaw. Vop. rent. i onk. 7:275-280 1963. (MIRA 1963)

TATARYAN, A.O., mladshiy nauchnyy sotrudnik; NAGASHTYAN, L. .

Combined contrast in X-ray studies of the urinary bladder top.
rent. 1 onk. 78111-114, '63 (MIRA 711)

NAGARISHVILI, G.P., zasluzhennyy deyatel' nauki, professor

Transcaucasian Radiological Conference. Med. rad. 1 no.3:97-99

My-Je '56.

(MLRA 9:10)

(X RAYS--PHYSIOLOGICAL EFFECT)

NAGATA, J. (Warsaw)

On a special metric and dimension. Funk math 55 no.2:181-194
'64

MEGATKIN, A.

Problems of designers. ITC 3 no.11:14-16: '61.

(MIA 14:10)

1. Nachal'nik osobogo konstruktorskogo byuro moskovskogo priborostroitel'nogo zavoda "Manometr" ~~tehnicheskogo obshchestva s ogranichennoy otvetstvennostyu~~
tehnicheskogo obshchestva s ogranichennoy otvetstvennostyu.
(Moscow--Manometer--Technological innovations)

NAGATKIN, A.G.

K-2

USSR/Processes and Equipment for Chemical Industries -
Control and Measuring Devices. Automatic Regulation.

Abs Jour : Ref Zhur - Khimiya, No 2, 1957, 6979

Author : Nagatkin, A.G.

Inst :

Title : High Pressure Manometer with Tubular Spring of a New Type

Orig Pub : Priborostroyeniye, 1956, No 5, 13-16

Abstract : The specific feature in the design of Class 0.5 and 1 manometers for nominal pressures of up to 10 000 kg/cm², which have been put in production at the "Manometr" plant in Moscow, is a tubular spring [bourdon tube] of a new type made from standard grade alloy steel 50 KhFA. Two variants in the cross section of the new spring are considered: with a flat and with an offset channel, which constitute the simplest solution, as concerns design and technology, of the new shaping principle of the tubular spring. The principle is based upon the fact

Card 1/2

NAGATKIN, A.G.

~~Development in designing mercury-free differential manometers and~~
flow-meters. Priborostroenie no.8:18-21 Ag '56. (MLRA 9:10)

(Manometer) (Flowmeters)

L 5361-66 EWT(1)/EWA(h)

ACC NR: AP5026106

SOURCE CODE: UR/0119/65/000/010/0003/0005

AUTHOR: Vaynshteyn, A. L. (Engr.); Nagatkin, A. G. (Engr.); Ovcharov, Ye. V. (Engr.); Yurovskiy, A. Ya. (Engr.)

25
B

ORG: none

TITLE: Standardized system of sensors 75

SOURCE: Priborostroyeniye, no. 10, 1965, 3-5

TOPIC TAGS: transducer, sensor 0

ABSTRACT: The standardized modular system of sensors consists of three principal groups -- with pneumatic, (electric) current, and frequency outputs. Each instrument comprises a sensing element, which converts the measurand into a proportional mechanical force, and a transducer, which converts this force into a pneumatic, current, or frequency output. The sensors cover manometers, vacuumeters, draft gages, differential manometers, flowmeters, float-type level gages, densimeters, manometric thermometers, etc., a total of 800 type-scale varieties. Thanks to standard multirange designs, the above 800 varieties can be assembled from 136 types and sizes. The sensors are rated as high-accuracy instruments (errors: 0.6,

Card 1/2

UDC: 621.3.083.8

0701 1166

L 5361-66

ACC NR: AP5026106

1, 1.6%). The new standardized sensors meet the specifications of the Universal International System of Automatic Control and are in the developmental stage. Orig. art. has: 4 figures.

SUB CODE: IE/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 000

BC
Card 2/2

S/081/62/000/022/084/088
B101/B186

AUTHORS: Nagava, A. P., Zhinkin, D. Ya., Borisov, M. P.

TITLE: Electrical insulating lacquer KM-17 (KM-17) and its use

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1962, 559, abstract 22P525 (Lakokrasochn. materialy i ikh primeneniye, no. 5, 1961, 58 - 60)

TEXT: The properties of KM-17 organosilicon lacquer (I) consisting of a 50 % solution of polymethyl-phenyl siloxane in toluene were studied. It is shown that films of I supported on oxidized aluminum foil have high insulating properties at 20 - 300°C. Tables indicate the dielectric properties of films of I (1) after thermal aging (200 and 500 hrs at 250 and 300°C); (2) after exposure to 95 - 98 % relative humidity and thermal aging; (3) after the effect of a "thermal shock" (exposure 1 hr each at -60 and at +250°C). It was found that I resisted thermal aging and the effect of tropical humidity; it can, therefore, be used to impregnate and coat products of oxidized Al subject to temperatures between -60 and +350°C, and also to bond and impregnate glass fiber insulations on oxidized conductors exposed to working temperatures of 350°C. [Abstracter's Card 1/2

Electrical insulating lacquer...

S/081/62/000/022/084/088
B101/B186

note: Complete translation.

Card 2/2

NAGAVITSYN, MIKHAIL TIMOFEYEVICH

~~NAGAVITSYN, Mikhail Timofeyevich~~, kandidat ekonomicheskikh nauk;

SUPONITSKIY, S.A., redaktor; USHOMIRSKIY, M.Ya., redaktor izdatel'stva; SHLYK, M.D., tekhnicheskij redaktor

[Reproduction of gross national capital; lecture material for the course "Political economy"] Vospriizvodstvo obshchestvennogo kapitala. Materialy k lektsii po kursu politicheskoy ekonomii. Moskva, Gos. izd-vo "Sovetskaya nauka," 1957. 42 p. (MLRA 10:9)
(Capital)

NAGAVITSYN, Mikhail Timofeyevich; BAKOVETSKIY, O.D., red.; ROTOVA,
R.S., red. izd-va; MURASHOVA, V.A., tekhn. red.

[The accumulation of capital and the worsening of the working
class' condition] Nakoplenie kapitala i ukhudshenie polozheniia
rabochego klassa. Moskva, Vysshiaia shkola, 1962. 101 p.
(MIRA 15:12)

(Capital) (Labor and laboring classes)

NAGAVITSYN, M. T.

The "theory" and practice of so-called "human relations." Sots.
trud 7 no. 4:33-41 Ap '62. (MIRA 16:1)
(Industrial relations)

Nagawiecki, J.

3876

621.43(438):629.12

Nagawiecki J. "Renag" Sea-Going Boat Compression-Ignition Engine.

"Wysokoprężny silnik morski typu „RENAG”. Przegląd Mecha-
niczny. No. 10, 1954, pp. 313—317. No. 11, 1954, pp. 359—361, 18 figs, 3 tabs.

A three cylinder, two-stroke, valveless, 90 HP compression-ignition engine for the propulsion of fishing vessels has been designed and manufactured in Poland. Leading particulars are as follows: cylinder diameter $D = 160$ mm; stroke length $s = 272$ mm; engine speed $n = 500$ r.p.m.; stroke volume $V = 16.41$ litres; compression ratio $E = 16$; maximum pressure $P_{max} = 61-63$ kg per sq. cm. In the article are described the construction of separate engine components, together with the oil, cooling, fuel, and starting air circulating systems. Dynamometric tests prove that, at a speed ranging from 431 to 460 r.p.m., the maximum fuel consumption amounts roughly to 166 g per HP, which gives a total engine efficiency value of 37%. The engine has stood long period load-tests, and has been run satisfactorily for 48 hours with 85 HP load at a speed of $n = 510$ r.p.m. The engine has also stood other tests of its reliability under sea-going conditions.

EP

NAGAY, Boleslaw

Contribution to the technic of nailing the femur with Knuentscher's
method. Chir. narzad. ruchu ortop. pol. 28 no.1:97-99 '63.

1. Z Oddzialu Chirurgii Ogolnej Szpitala Wojewodzkiego w
Koszalinie Ordynator: dr J. Szantyr.
(FRACTURE FIXATION) (FEMORAL FRACTURES)

NAGAY, Boleslaw

Clinical evaluation of a new method of blood platelet count
with Björkmann's method. Pol. tyg. lek. 18 no.44:1645-1647
28 0'63.

1. Ze Szpitala Wojewodzkiego w Koszalinie (dyrektor: J.Szantyr)
i z Zakladu Farmakologii AM w Gdansk (kierownik: prof.dr.med.
J.K. Teuchmann).

*

SZANTYR, Jozef; NAGAY, Boleslaw

Stab wound of the right heart ventricle. Pol. przegi. chir.
37 no.11:1173-1174 N '65

1. Z Oddzialu Chirurgii Ogolnej Szpitala Wojewodzkiego w
Koszalinie (Ordynator: dr. J. Szantyr).

NAGAY, S.

[Water supply and sewage systems in the Soviet Union] Vodopostachannia i kanalizatsiia v SSSR. Miunkhen, 1955. 110 p. (Institut zur Erforschung der UdSSR. Issledovaniia i materialy, Ser. 2, no.35) (MIRA 8:12)

(Water supply) (Sewerage)

NAGAYBAKOV, A.A.

More attention to orchards. Zashch.rast.ot vred.i bol. 4
no.6:8-9 N-D '59. (MIRA 15:--)

1. Nachal'nik Tashkentskogo oblastnogo otryada po bor'be s
vreditelyami i boleznyami rasteniy.
(Bostandykskiy District--Fruit--Diseases and pests)

PALIY, V.F.; POMAZKOV, Yu.I.; KUZNETSOVA, Ye.; RYVKIN, B.V.; NAGAYBAKOV, A.A.

Local information. Zashch. rast. ot vred. i bol. 8 no.3:60-61
Ag '63. (MIRA 16:10)

L 31510-66 EWT(1)/EWT(m)/EWP(+)/ETI IJP(c) JD/JG
 ACC NR: AP6008552 SOURCE CODE: UR/0166/66/000/001/0081/0084
 AUTHOR: Kel'bert, S.L.; Nagaybekov, R.B.; Yagudayev, A.M. 73
 ORG: Physics Technical Institute, AN UzSSR (Fiz'ko-tekhnicheskii institut AN UzSSR) B
 TITLE: Some problems of ²pulse discharges in a vacuum
 SOURCE: AN UzSSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, no. 1, 1966, 81-84
 TOPIC TAGS: refractory metal, pulse discharge, electrode, metal property
 ABSTRACT: The authors study some problems of heavy-current commutation and erosion of electrodes made of refractory metals (Mo, W) in a vacuum. An analysis is made of the diffusion products precipitated on various base layers. The erosion of Mo, W electrodes has been determined in a vacuum in a pulse discharge. A qualitative dependence of the products of erosion on the parameters of the circuit is detected. A possibility is established for the creation of coatings of refractory metals of various density. Orig. art. has: 4 figures.
 SUB CODE: 11 / SUBM DATE: 02Jul65 / ORIG REF: 001 / OTH REF: 001

Card

1/1 mc

VASYUTINSKIY, S.V., kand. tekhn. nauk; NAGAYENKO, G.P., inzh.

Heat calculations for current-conducting tubing. Vest. elektroprom.
28 no.10:44-47 0 '57. (MIRA 10:12)

1. Leningradskiy politekhnicheskii institut.
(Electric conductors)

VASYUTINSKIY, S.B.; NAGAYENKO, G.P.

Designs and basic equations of electrodynamic vibrators. Trudy LPI
no.192:141-153 '58. (MIRA 11:6)
(Vibrators)

(Dynamics and Strength of Machines; Collection of Articles) Moscow, Mashgiz,
1958. (Series: Its: Leningrad Polytech Inst. Trudy, No. 192) 234 p.

8(2)

AUTHORS:

Vasyutinskiy, S. B., Candidate of Technical Sciences.
Nagayenko, G. P., Engineer. Fedorin, V. I., Engineer.

TITLE:

Shielding Solid Steel Parts of a Vibration Test Stand Against Alternating Magnetic Fields (Ekranirovaniye stalnykh massivov vibrostenda ot peremennogo magnitnogo polya)

PERIODICAL:

Elektrichestvo, 1959, Nr 3, pp 37 - 41 (USSR)

ABSTRACT:

This is a description of an electrodynamic vibration test stand. If in such a test stand copper shields in the form of short-circuited rings are installed, which cover the surface of the core of the annular pole in those places, where the movable winding is located, this will lead to a considerable reduction of the active and reactive power output. No reduction, however, of the mechanical force developed by the test stand will occur due to this measure. By a table it is shown that the application of shields leads to a reduction of the power drawn by the test stand from the supply grid by a factor of 4.23 and to a reduction of the active power in the iron by a factor of 11.5. The copper losses in the movable winding have been reduced by the application of shields.

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Shielding Solid Steel Parts of a Vibrator Test Stand
Against Alternating Magnetic Fields

BY A. I. KURKOVA, 1977

The calculation of apparatus similar to that at hand without shields is very complicated. It can be simplified if it is assumed that if shields are used the magnetic alternating field does not enter the area over. This assumption has been proved right by experiment. It was shown that with shields the magnetic alternating flux at the core surface is generated by a magnetizing force, which is only 5-10% of the magnetizing force of the movable winding. In this case a system composed of a movable alternating current winding and of short-circuited shields can with sufficient accuracy be looked upon as an air transformer with three windings and short-circuited secondary windings. Equations (1) (3) and (4) are written down, specifying the EMF of the windings. The solutions of these equations give the voltage at the movable winding and the amperages in the shields. The active power is computed according to equation (7), and the intrinsic losses in the movable winding according to equation (8). In order to check this method of computing the shields and of estimating the efficiency of shielding experiments were carried out at a model test stand of the Leningradskiy politekhnicheskii

Card 2/3

Shielding Solid Steel Parts of a Vibration Test Stand
Against Alternating Magnetic Fields

UW/00-50-3-1/80

institut (Leningrad Polytechnical Institute). The results obtained and the results advanced in this paper demonstrated that a shielding of iron cores by copper shields in installations as described here is very effective. A shielding of iron cores is particularly expedient for high frequency. The experiments carried out substantiated the correctness of the method advanced in this paper of the electromagnetic calculation of apparatus, which are similar to the electro-dynamical vibration test stand and which are equipped with a magnetic shielding against magnetic alternating fields. There are 7 figures, 1 table and 3 Soviet references.

ASSOCIATION: Leningradskiy politekhnicheskii institut im. Kalinina (Leningrad Polytechnical Institute imeni Kalinin)

DATE ISSUED: November 10, 1958

Card 3/3

VASYUTINSKIY, S.B., inzh.; NAGAYENKO, G.P., inzh.

Determination of the principal dimensions of electrodynamic
vibrators. Vest. elektrom. 32 no.10:73-75 C '61. (MIRA 14:9)
(Vibrators)

VASYUTINSKIY, S.B., kand.tekhn.nauk, dozent; NAGAYENKO, G.I., inzh.

Determination of the impedance of inductively coupled single-layer windings operating in a wide frequency range. Elektrichesvo no.12:49-52 D '65. (MIRA 1966)

1. Leningradskiy politekhnicheskij institut imeni Kalinina.

NAGAYENKO, V.A.

Separation of collective copper-lead-zinc pyrite concentrates containing secondary copper sulfides and oxidized copper. TSvet. met. 34 no.3:1-3 Mr '61. (MIRA 14:3)

1. Nauchno-issledovatel'skiy institut mekhanicheskoy obrabotki poleznykh iskopayemykh.
(Flotation) (Nonferrous metals)

NAGAYENKO, V. A.

Dressing of lead ores containing pyrrhotite, iron carbonates,
and an insignificant quantity of zinc. Trudy Mekhanobr no. 131:
196-201 '62. (MIRA 17:5)

NAGAYEV, A. V.

Large deviations for a certain class of positive random
variables. Izv. AN Uz.SSR. Ser. fiz.-mat. nauk 7 no.1:18-20
'63. (MIRA 16:4)

1. Tashkentskiy gosudarstvennyy universitet imeni V. I. Lenina.

(Probabilities)

NAGAYEV, A.V.

A theorem on large deviations. Teor. veroyat. i stat. 1964, 10:107-164.

NAGAYEV, DM.

3600. NAGAYEV, DM. V Severnoy Atlantike. (Sel'dyanoy Promysel) Ocherk. (M.), Profizdat, 1954. 955. 16sm. 30,000ekz. (1-y Zavod 15 tys.) lr. 20k (54-57674) P 639.222 (261)

SO: Knizhnaya Letopis', Vol. 3, 1955

NAGAYEV, D.

A delayed event. Izobr.i rats. no.12:30 D '58. (MIRA 11:12)

1. Spetsial'nyy korrespondent zhurnala "Izobretatel' i ratsionaliza-
tor."

(Kharkov--Tractor industry)

NAGAYEV, D.

Fame comes back. Izobr.1 rats. no.7:32-34 J1 '59.
(MIRA 12:11)

(Tea machinery)

~~21(1)~~ 24.7700

SOV/155-58-4-22/34

AUTHOR: Nagayev, E.L.

TITLE: On the Catch of Electrons and Holes by Excitons in Ionic Crystals (O zakhvate v ionnykh kristallakh elektronov i dyrok eksitonami)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 4, pp 135 - 140 (USSR)

ABSTRACT: The author sets up a Schrödinger equation for excited electrons and holes in coordinate representation. It is shown that in an ionic crystal the state in which the exciton and the current carrier form a single quasi particle (triple) may be more favorable than the state in which the exciton and the current carrier move independently from each other. The author thanks F.F. Vol'kenshteyn and V.L. Bonch-Bruyevich. There are 7 references, 4 of which are Soviet, 2 German and 1 American.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov)

SUBMITTED: April 24, 1958

Card 1/1

NAGAYEV, E. L., CAND PHYS-MATH SCI, "ON THE QUANTUM
THEORY OF CHEMOSORPTION ON IONIC CRYSTALS." MOSCOW,
1961. STATE SCI RES INST OF ELECTROTECHNICAL GLASS).
(KL-DV, 11-61, 209).

-17-

31240

S/195/61/002/006/002/00
F032/F514

24,2900 (1068, 1147, 1164)

AUTHOR Nagayev E. I.

TITLE The magnetic properties of a layer of adsorbed atoms

PERIODICAL Kinetika i kataliz v 2 no 6 1961 847-853

TEXT The author is concerned with the magnetic properties of a layer of adsorbed paramagnetic atoms executing vibrations about their mean positions and subject to interatomic exchange forces. The aim is to determine whether a layer of this type can have ferromagnetic properties. The following model is employed: each adsorbed atom contains one unpaired electron which is responsible for the retention of the atom on the surface of the base, since it partly penetrates into the latter. This type of adsorption was first discussed by L. E. Vol'kenshteyn (Ref. 2, Zh. fiz. khim. 21, 1317, 1947) who assumed the adsorption centres to be cations. The present author discusses the case where the adsorption centres are anions. For the sake of simplicity it is assumed that the atoms form a plane periodic structure with a square elementary cell. In the case of adsorbed atoms (as opposed to molecules) the binding energy of the atom to the adsorption centre should be

Card 1/6

1240

10. magnetic properties of a

S/195/61/002/000/011/000
FD32/F514

greater than the interatomic exchange interaction energy. The exchange integral is assumed to be positive and dependent on the interatomic distance only. It is shown that spontaneous magnetization (ferromagnetism) is not possible for a two-dimensional system of atoms which vibrate about their mean positions. This is a generalization of the result obtained by Bloch and Sommerfeld in Ref. 1 (Electron theory of metals, 1938) for a two-dimensional system of fixed atoms. In weak magnetic fields and at high temperatures, the magnetic moment M of the adsorbed layer is proportional to the magnetic field strength, i.e.

$$M = \frac{N}{kT} H \chi$$

where M is the net magnetization, N is the number of adsorbed atoms per unit area, k is Boltzmann's constant and T the temperature of the layer. The quantity χ is interpreted as the square of the effective number of free magnetic ions per atom. It is given by

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31240

The magnetic properties of a ...

S/195/61/002/006/002/002
E032/E514

$$\frac{1}{x} = \frac{2}{\pi} \frac{1}{\sqrt{1 + \frac{8J_0}{kT}x}} K\left(\frac{i \frac{4J_0}{kT}x}{\sqrt{1 + \frac{8J_0}{kT}x}}\right) \quad (2)$$

where J_0 is the exchange integral for nearest neighbours and K is the complete elliptical integral of the first kind. These formulae hold provided

$$\frac{2\mu_B H}{kT} \ll 1; \quad (3)$$

$$\frac{3J_0}{kT} \ll 1. \quad (4)$$

Thus, in weak magnetic fields at sufficiently high temperatures the magnetic moment is proportional to the field, while the magnetic susceptibility is positive and is independent of the

Card 3/6

The magnetic properties of a ...

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EO32/E514

field strength. The adsorbed layer behaves as a paramagnetic but has the following special properties:

a) The number of Bohr magnetons per atom is much greater than unity when the condition

$$xJ_0/kT \gg 1$$

(5)

is satisfied;

b) the temperature dependence of the magnetic moment is then much stronger than for ordinary paramagnetics and if the exchange integrals and the temperature are such that the condition given by Eq.(5) is reversed, then the adsorbed layer behaves as an ordinary paramagnetic. When the condition opposite to that given by Eq.(4) holds, the magnetic moment of the system tends to saturate and is given by

$$M = \mu_B M \left[1 + \frac{kT}{4\pi J_0} \ln \left(1 + \exp \left\{ -\frac{2\mu_B H}{kT} \right\} \right) \right].$$

(7)

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The magnetic properties of a ...

312h0

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EO32/E514

provided

$$\frac{J_0}{kT} = \frac{1}{4\pi} \ln \left(1 - \exp \left\{ -\frac{2\mu_B H}{kT} \right\} \right) \quad (8)$$

When $J_0 = 0$

$$\mu_B \ln \left[1 - 2e^{-\frac{2\mu_B H}{kT}} \right] \quad (9)$$

provided

$$\frac{\mu_B H}{kT} \rightarrow 1$$

Finally, a study is made of the effect of the magnetic field on the frequency of vibration of the adsorbed atoms with particular reference to vibrations parallel to the plane of the base. An expression is obtained for the frequency spectrum. The present theory throws some doubt on the conclusions of N. I. Kobozev et al. (Ref.5: Zh.fiz. khimii, 26, 1349, 1952; Ref.6: Ibid, 28,362, 1954; Ref.7: Ibid, 33, 2811, 1959) that "super-paramagnetism" is associated with isolated non-interacting adsorbed atoms. On Card 5/6

The magnetic properties of a ...

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EO32/E514

the contrary, the present author suggests that the observed effect may be related to the presence of exchange interaction between adsorbed atoms (assuming that the effect is real and not due to experimental errors). As regards the temperature dependence of the magnetic moment of the adsorbed layer, the present results indicate that if the number of Bohr magnetons is much greater than unity, then the magnetic moment should decrease exponentially with the reciprocal of the temperature. On the other hand, Kobozev found (Ref.6) that the magnetic moment of a super-paramagnetic is proportional to the reciprocal of the temperature. Further experimental studies of this point are recommended. They should provide information about the interaction between adsorbed particles. Acknowledgments are expressed to N. D. Sokolov for discussions. There are 12 references: 10 Soviet-bloc (1 a translation from English and 1 a translation from German) and 2 non-Soviet-bloc. X

ASSOCIATION: Nauchno-issledovatel'skiy institut elektrotekhnicheskogo stekla Moskva (Scientific Research Institute for Electrotechnical Glass, Moscow)

SUBMITTED: February 24, 1961 (Initially)
Card 6/6 June 29, 1961 (After revision)

2°076 S/181/61/003/C09/C08/C39
B102/B104

+

24,7700

AUTHOR: Nagayev, E. L.

TITLE: Conduction mechanism in low-mobility semiconductors

ARTICLAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 2107 - 2117

TEXT: Discrepancies in the quantum-mechanical analysis of the conduction mechanism of semiconductors found in the literature caused the author to conduct a new theoretical study. In his opinion, these discrepancies are due to the neglect of the degeneracy of the systems concerned and to the use of a wave function of zeroth order. In an ideal crystal, the electron considered may be described by wave functions spreading over the whole crystal. In this way, a better description is obtained of the fact that mobility is an exponential function of temperature. Describing the electron by a "distributed" wave function contradicts, however, Varley's classical representation. To compare the results of his calculations with those of Holstein, a one-dimensional model of a semiconducting ion crystal of low carrier mobility is considered. The results of the present paper may be generalized in a trivial manner to cover three-dimensional models.

Card 1/2

Conduction mechanism in...

2P076 S/151/01/003/003/003/013
B102/B104

+

The relation

$$\mu \sim \int^2 \frac{e \tau a^2}{\hbar^2} \sqrt{\frac{\hbar \omega}{2\pi\gamma(1+b)kT}} \exp\left\{-\frac{\gamma\hbar\omega}{2(1+b)kT}\right\}. \quad (15)$$

is obtained for the mobility of a polaron in the ideal crystal; a is the lattice constant, τ is the relaxation time, $\frac{1}{2}\hbar\omega/(1+b)$ is the activation energy, γ is the electron-phonon coupling constant, $kT/\hbar\omega$ is the mean number of phonons. This result contradicts the one obtained by Holstein. It is concluded from a discussion of results that Holstein's are inaccurate. There are 13 references: 4 Soviet and 9 non-Soviet. The four most recent references to English-language publications read as follows: C. Doner, Adv. in Semicond. Science, 23, 1958; T. Holstein, Ann. of Phys., 3, 323, 1958; Jamashita, Kurosawa, J. Phys. Soc. Jap., 13, 802, 1958; Kurosawa, J. Phys. Soc. Jap., 13, 1211, 1958.

ASSOCIATION: NII elektrotekhnicheskogo stekla Moskva (NII of Electr. - technical Glass, Moscow)

SUBMITTED: March 11, 1961

Card 2/2

NAGAYEV, E.L.

Chemisorption on not quite polar crystals. Zhur. fiz. khim. 35
no.2:327-335 F '61. (MIRA 16:7)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Crystals) (Sorption)

NAGAYEV, E.L. (Moscow)

Chemisorption of atoms with the participation of conductivity
electrons of the crystal. Zhur.fiz.khim. 35 no.10:2376-2382
0 '61. (MIRA 14:11)

1. Nauchno-issledovatel'skiy institut elektrotekhnicheskogo stekla.
(Sorpton) (Electrons) (Ionic crystals)

S/195/62/003/006/010/011
E075/E436

AUTHOR: Nagayev, E.L.

TITLE: On the theory of chemisorption on polar crystals

PERIODICAL: Kinetika i kataliz, v.3, no.6, 1962, 907-914

TEXT: The adsorptive properties of crystals are determined predominantly by the relative proportions of polar and homopolar bonds in crystals. For a perfectly polar crystal the adsorbed molecule gives up one of its electrons to the crystal with the resulting energy gain. For a purely homopolar crystal the adsorbed molecule retains its electrons and a three-electron bond results. An adsorbed atom forms a strong two-electron bond with homopolar crystals, but a weak single electron bond is formed with polar crystals. The strength of adsorption of an atom on a crystal is the greater the higher the proportion of two-electron bond. This proportion increases with the homopolar character of the crystal and its narrowing forbidden zone. The energy of dissociation of an adsorbed molecule decreases as the forbidden zone narrows. In the presence of certain defects on the surface the adsorption near the defects is favoured energetically. For Card 1/3

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monovalent electro-positive atoms adsorbed near a relatively highly charged ion, replacing a weakly charged cation in the crystalline lattice, the energy of adsorption is higher than that on the ideal surface. Conversely the energy of adsorption of a molecule near the defect decreases and the activation energy increases compared with the energy of adsorption on the ideal surface. If the charge of an ionic impurity is smaller than that of the cation that the ion replaces, the activation energy of chemisorption near such a defect decreases and the bond strength between the adsorbed molecule and the surface increases, the bond strength for the adsorbed atom also decreases. The authors indicate that it would be desirable to check experimentally the postulated theories by 1) checking the dependence of the character of chemisorption on the width of the forbidden zone; this could be done by conducting experiments on pure surfaces at low temperatures, which should give low concentrations of the supports in the surfaces and 2) investigating the effect of surface defects in the surfaces with the concentration of the support small in comparison to that in the bulk of the crystal.

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There are 4 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut
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Institute of Electrotechnical Glass)

SUBMITTED: October 15, 1960

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U/181/55/004/00 / 112
2102/R01

14,7700 (1025, 1042, 1055)

AUTHOR: Nagayev, E. L.

TITLE: Antiferromagnetic semiconductors with low carrier mobility

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 413-418

TEXT: The problem of the origin of mobility activation energy is dealt with for a small polaron in an antiferromagnetic semiconductor crystal. This is a continuation of an earlier paper (Nagayev, FTT, 2, no. 2, 196) the results of which are here generalized for the case of non-zero sublattice magnetic moment. A simple cubic lattice without defect is considered whose Hamiltonian (lattice + conduction electrons + magnetization electrons) in the nearest-neighbor approximation can be given by

$$\begin{aligned} \mathcal{H} = & \mathcal{H}^0 + \mathcal{H}^d (\mu^2) + H_1 + \sum_{p\beta} (L(p, \beta; p, \beta) + \\ & + \sum_k B_k(p, \alpha; p', \alpha') Q_k) a_{p,\beta}^* a_{p,\beta} + \\ & + \sum_{p\beta} \sum_{p'\beta'} L(p, \beta; p' + s, \beta') a_{p,\beta}^* a_{p'+s,\beta'} \end{aligned}$$

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with

$$L(\mathbf{p}, \beta; \mathbf{p}', \beta') = \sum_{\alpha\alpha'} \sum_{\sigma\sigma'} U_{\mathbf{p}\mathbf{p}'}(\alpha, \sigma; \beta) [L(\mathbf{p}, \alpha, \sigma; \mathbf{p}', \alpha', \sigma') + \\ + 2\sigma\mu] (\alpha, \alpha') (-1)^{p_x+p_y+p_z} \delta(\mathbf{p} - \mathbf{p}') \delta(\sigma - \sigma') U_{\mathbf{p}'}(\alpha', \sigma'; \beta'). \quad (7)$$

the vector $\vec{\epsilon}$ taking the values (1, 1, 0), (1, 2, 0), (0, 0, 1). The spectrum is determined for weakly excited conduction electrons if μ in (6) is temperature-dependent. The mean square deviation for high temperatures results in

$$\langle I^2 \rangle_p = \frac{6}{\pi} \sqrt{\frac{1}{2\pi\gamma(n+\frac{1}{2})}} f(0, T, m) \left\{ I_1^2 \left[1 + \exp\left(-\frac{m\hbar\omega}{kT}\right) \right] \exp\left(-\frac{\gamma}{2n+\frac{1}{2}}\right) + \right. \\ \left. + 2I_2^2 \exp\left[-\frac{\left(\gamma+\frac{m}{2}\right)^2}{(2n+\frac{1}{2})\gamma}\right] \right\} \quad (2d)$$

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$$m = \frac{L(\mathbf{p}, \mathbf{b}; \mathbf{p}, \mathbf{b}) - L(\mathbf{p}, \mathbf{a}; \mathbf{p}, \mathbf{a})}{\hbar\omega} \approx \frac{2\mu |\mathbf{k}(\mathbf{a}, \mathbf{a})|}{\hbar\omega}. \quad (13);$$

$\gamma = A^2 / 2M\omega \hbar\omega$, n - average number of phonons. (24) is valid for discrete temperature values. Electron transition to higher levels with phonon absorption makes only a small contribution and can be neglected. For a perfect crystal the carrier mobility is given by

$$u \sim \frac{e\tau a^2}{kT\hbar^2} \sqrt{\frac{1}{2\pi\gamma \left(n + \frac{1}{2}\right)}} \left\{ I_1^2 \exp\left(-\frac{\gamma}{2n+1}\right) + \right. \quad (18); \\ \left. + I_2^2 \exp\left[-\frac{\left(\gamma + \frac{\pi}{2}\right)^2}{(2n+1)\gamma}\right] \right\}.$$

in the regions where the crystal is not perfect the mobility can be expressed by the averaged probability W of one cell-to-cell transition of
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carrier per unit time: $u = \frac{ea^2 \dot{N}}{kT}$. (a - lattice constant, $\dot{N}$ - rate of change of time). The probability is calculated.

$$W(p, \beta; p', \beta') = \frac{L^2(p, \beta; p', \beta')}{\mu^2} g(p, \beta) \left[\frac{\pi \hbar M}{\sum_k \left(n_k + \frac{1}{2} \right) [B_k(p') - B_k(p)]^2} \right]^{1/2} \quad (4)$$

$$\times \exp \left\{ \frac{[\epsilon(p, \beta) - \epsilon(p', \beta')] - \sum_k \frac{[B_k(p') - B_k(p)]^2}{2M\omega_k^2}}{4[B_k(p') - B_k(p)]^2 \left(n_k + \frac{1}{2} \right)} - \sum_k \frac{1}{M\omega_k^2} \right\}$$

$$\epsilon(p, \beta) = L(p, \beta) - \sum_k \frac{B_k^2}{2M\omega_k^2}$$

$$g(p, \beta) = \frac{\exp \left\{ -\frac{\epsilon(p, \beta)}{kT} \right\}}{\sum_{p, \beta} \exp \left\{ -\frac{\epsilon(p, \beta)}{kT} \right\}}$$

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It can be seen that the carrier mobility in a non-ideal crystal is determined by the activation energy, which is given by $E_a = \gamma \hbar \omega$ for transitions from one sublattice to another take place with change $\pm \gamma$ and if not, by $E_a = \frac{(\gamma + E/2) \hbar \omega}{2\gamma}$. The perfect regions of the crystal are

extended when temperature is raised. At lower temperature, mobility is due to random migration; at high temperatures mobility can be described by a band mechanism. The thermo-emf of a semiconductor with low carrier

mobility is found to be $\alpha = \frac{\pi}{e} \left[\ln \frac{1-c}{c} + \ln r \right]$, $c = \frac{N_e}{N}$; N_e - number of

carriers, r - multiplicity of electron ground state degeneracy. Yu. I. Irkhai (FML, 6, 14, 1960; 7, 1, 1962), S. V. Vorsovskiy et al. (ZhETF, 29, 57, 1955), S. V. Tyablikov (Avtoref MGU, 1964), E. I. Zhukov (Izv. AN SSSR, ser. fiz. No. 1, 1967), S. I. Iekar (ZhETF, 41, 1961, 1962) and A. G. Samoylovich (Termodinamika i statisticheskaya fizika - Thermodynamics and statistical physics, - Izd. M-e, M.-L., 1964) are mentioned. There are 12 references, 12 Soviet and 3 non-Soviet. The

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810/8108

Antiferromagnetic semiconductors with

four most recent references to English-language publications listed as follows: 1. Zener, Adv. in Semicond. Sci., 10, 1964; 2. Sewell, J. Phys. Soc., 24, 1964; 3. Yamashita, T. Kurosawa, J. Phys. Soc. 24, 1964; 4. Yamashita, T. Kurosawa, J. Phys. Soc. 24, 1964.

ASSOCIATION Nauchno-issledovatel'skoy institut elektrotekhnicheskoy fiziki
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1973
S/181/62/004/008/023/04
B102/B104

24.7000

AUTHOR: Nagayev, E. L.

TITLE: Conductivity of crystals in the case of strong electron-phonon interaction (small-radius polaron)

ABSTRACT: Fizika tverdogo tela, v. 4, no. 6, 1962, 1201-1211

TEXT: In continuation of previous studies (Refs. 7, 8; PTL, 4, 1962, 1201-1211, 1962) the electrical conductivity of crystals in which small-radius polarons play the role of current carriers is examined, the object being to arrive at more general and more exact results and to show that the band model is applicable also to crystals with a continuous phonon spectrum. The energy spectrum and polaron mobility are considered both for Einstein (Refs. 7, 8) and for continuous phonon spectra. In contradistinction to Refs. 7, 8 the author bases his studies on the symmetry properties of the system lattice-electron; because of these properties the energy spectrum of the system consists of bands with a cosine-law dispersion. Electron-phonon interaction is manifest in the renormalization of the Bloch integrals J which, in the case of the small-

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radius polaron, are small with respect to the polaron formation energy. The determination of the energy spectrum is based on the eigenfunction of the system in zeroth approximation with respect to $\tilde{J}$:

$$\varphi_{\mathbf{g}, l} = \varphi_{\mathbf{g}}(\mathbf{r}) \prod_{\mathbf{k}, j=1,2} \Phi_{N_{\mathbf{k}, j}}(Q_{\mathbf{k}, j} - Q_{\mathbf{k}, j}^0) = \varphi_{\mathbf{g}}(\mathbf{r}) |l, \mathbf{g}\rangle, \quad (1)$$

$$Q_{\mathbf{k}, j}^0 = -\frac{A_{\mathbf{k}}}{\sqrt{NM}\omega_{\mathbf{k}}} \begin{cases} \cos \mathbf{k}\mathbf{g}\mathbf{a}, \\ \sin \mathbf{k}\mathbf{g}\mathbf{a}. \end{cases}$$

where $\varphi_{\mathbf{g}}(\mathbf{r})$ is the Wannier function of atom with number $\mathbf{g} = (g_x, g_y, g_z)$, $\Phi_{N_{\mathbf{k}, j}}$ is the oscillator wave function with quantum number $N_{\mathbf{k}, j}$, $\mathbf{N}_{\mathbf{k}, j}$ denotes the totality of these quantum numbers; M the mass of lattice point, $\omega_{\mathbf{k}}$ the frequency of vibration with momentum $\mathbf{k}$; $\omega_{\mathbf{k}, j}$ are phonon frequencies. Ritz's method is used to obtain the spectrum in the approximation which follow. The first and second moments of the distribution function of the renormalized Bloch integrals are determined. For a free phonon field the

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First moment decreases rapidly and the second moment increases exponentially with increasing temperature. The activation energy is found to equal the half polaron formation energy. Such a temperature dependence of the second moment leads to an exponential increase of the polaron mobility with temperature, i. e. the band polaron has an activated mobility.

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March 23, 1962 (after revision)

Card 3/3

MAGAYEV, E. L.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Institute of Physical Chemistry in 1962:

"Quantum Sorption on Crystals."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

NAGAYEV, E.L.

Two conduction mechanisms in the theory of semiconductors of low mobility. Fiz. tver. tela 5 no.8:2380-2383 Ag '63. (MIRA 16:9)
(Semiconductors--Electric properties)